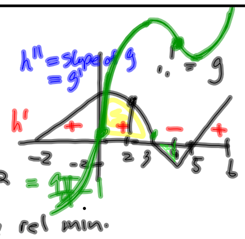
5. $h(x) = \int_0^x g(t)\,dt$ $h'' = $ slope of g $= g'$ $\therefore h' = g$



a) $h(4) = \int_0^4 g(t)\,dt$
$= \frac{1}{4}\pi \cdot 3^2 - \frac{1}{2}\cdot 1 \cdot 2 = \frac{9\pi}{4} - 1$

b) $[-2, 6]$ h has a rel min.

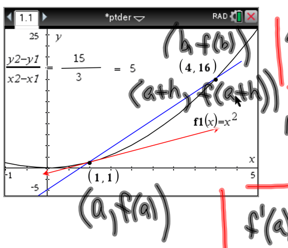
candidate list
~~x=3 h' changes from + to -~~
x=5 h' changes from - to + min at 5
x=-2 min at x=-2 b/c h'>0 near x=-2
~~x=6 max at x=6 b/c h'>0 near 6~~

c) $h'(2) = g(2) = \sqrt{5}$ $x^2+y^2=3^2$, $2^2+y^2=3^2$

d) infl. pts. when f''' changes sign at x=0, x=4
($h'' = g' =$ slope of g)

Feb 24-9:03 AM

Review 6 Average & Instantaneous Rates of change



ave rate $\frac{f(b)-f(a)}{b-a}$

inst. rate $\lim_{b\to a} \frac{f(b)-f(a)}{b-a}$

$f'(a) = \lim_{h\to 0} \frac{f(a+h)-f(a)}{h}$

ave rate approximates the inst. rate

Feb 24-9:46 AM

Ex 1

time (min)	0	4	8	12	16
Temp (°c)	65	68	73	80	90

a) Estimate the instantaneous rate at t=10
b) Explain the meaning of the result from part (a)

a) $\frac{80-73}{12-8} = \frac{7}{4}\ \frac{°c}{min}$

b) temp. increasing at a rate of about $\frac{7}{4}$ °c/min when t=10

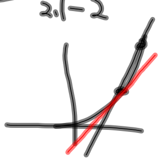
Feb 24-10:00 AM

Ex 2. A falling rock travels a distance of $16t^2$ ft. (t in seconds)

a) Find the average velocity on the interval [2, 2.1]

b). Does the ave vel in part (a) under or overestimate the inst. vel at t=2? Justify.

a) $\frac{16(2.1)^2 - 16(2)^2}{2.1-2} = 65.6\ \frac{ft}{sec}$

b)


over slope of sec > slope of tan

$f'(2) = 32 \cdot 2 = 64\ \frac{ft}{sec}$
$65.6 > 64$

Feb 24-10:16 AM